



SERVICE **110**  
MANUAL



**marantz**

model 110

*Fm / Am  
Stereophonic Tuner*

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## MODEL 110 SERVICE MANUAL

This Service Manual is the first revised edition for model 110 (Applied to production serial No. from 1001 to 1550).

Included in this service manual are schematic diagram, individual parts list and P.C. Board-Component Assembly Diagram.

On the circuit description alignment method and repairing hints, refer to the original service manual.

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REF. DESIG.	MARANTZ PART NO.	DESCRIPTION	REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
P200	YD2819003 (ZZ2819003)	P. C. Board P. C. Board Assembly	C209-C212 C213 C214-C217	DK1710301 DK1810402 DK1710301	Ceramic, 0.01 $\mu$ F, $\pm$ 20% Ceramic, 0.1 $\mu$ F, +80%, -20% Ceramic, 0.01 $\mu$ F, $\pm$ 20%
R201	RT1015114	Carbon, 150 $\Omega$ , $\pm$ 10%, 1/4W	C218 C219-C225 C226	DK1810402 DK1840302 DD1540001	Ceramic, 0.1 $\mu$ F, +80%, -20% Ceramic, 0.04 $\mu$ F, +80%, -20% Ceramic, 40pF, $\pm$ 5%
R202	RT1015214	Carbon, 1.5K $\Omega$ , $\pm$ 10%, 1/4W			SEMICONDUCTORS
R203	RT1033214	Carbon, 3.3K $\Omega$ , $\pm$ 10%, 1/4W			Transistor, 2SC829C
R204-R205	RT1010214	Carbon, 1K $\Omega$ , $\pm$ 10%, 1/4W	H201-H206 H207-H214 H215-H228	HT308291C HD2001105 HD1000105	Diode, 1S1555 Diode, 1N60
R206	RT1082114	Carbon, 820 $\Omega$ , $\pm$ 10%, 1/4W			MISCELLANEOUS
R207	RT1015114	Carbon, 150 $\Omega$ , $\pm$ 10%, 1/4W			Choke Coil, 6.8 $\mu$ H $\pm$ 20% 100mA
R208	RT1015214	Carbon, 1.5K $\Omega$ , $\pm$ 10%, 1/4W	L201 F201-F206 J201-J208	LC1682002 FF1107003 YP1000094	Ceramic Filter, SFA 10.7MHz Plug
R209	RT1033214	Carbon, 3.3K $\Omega$ , $\pm$ 10%, 1/4W	P500	YD2819005 (ZZ2819005)	P. C. Board P. C. Board Assembly
R210-R211	RT1010214	Carbon, 1K $\Omega$ , $\pm$ 10%, 1/4W			RESISTORS
R212	RT1010414	Carbon, 100K $\Omega$ , $\pm$ 10%, 1/4W	R501 R502 R503 R504 R505 R506-R507 R508-R509 R510 R511 R512	RT1015114 RT1010214 RT1010114 RT1022314 RT1022114 RT0582114 RT0568214 RT1010114 RT1056214 RT1015314	Carbon, 150 $\Omega$ , $\pm$ 10%, 1/4W Carbon, 1K $\Omega$ , $\pm$ 10%, 1/4W Carbon, 100 $\Omega$ , $\pm$ 10%, 1/4W Carbon, 22K $\Omega$ , $\pm$ 10%, 1/4W Carbon, 220 $\Omega$ , $\pm$ 10%, 1/4W Carbon, 820 $\Omega$ , $\pm$ 5%, 1/4W Carbon, 6.8K $\Omega$ , $\pm$ 5%, 1/4W Carbon, 100 $\Omega$ , $\pm$ 10%, 1/4W Carbon, 5.6K $\Omega$ , $\pm$ 10%, 1/4W Carbon, 15K $\Omega$ , $\pm$ 10%, 1/4W
R213-R214	RT1015114	Carbon, 150 $\Omega$ , $\pm$ 10%, 1/4W	R513 R514 R515 R516 R517 R518	RN1018414 RN1022214 RN1010414 RT1010114 RT1010114 RT1039214	Carbon, 180K $\Omega$ , $\pm$ 10%, 1/4W Carbon, 2.2K $\Omega$ , $\pm$ 10%, 1/4W Carbon, 100K $\Omega$ , $\pm$ 10%, 1/4W Carbon, 100 $\Omega$ , $\pm$ 10%, 1/4W Carbon, 100 $\Omega$ , $\pm$ 10%, 1/4W Carbon, 3.9K $\Omega$ , $\pm$ 10%, 1/4W
R215	RT1082114	Carbon, 820 $\Omega$ , $\pm$ 10%, 1/4W			CAPACITORS
R216	RT1015114	Carbon, 150 $\Omega$ , $\pm$ 10%, 1/4W	C501-C502 C503 C504 C505 C506-C507 C508 C509 C510 C511 C512	DK1710301 EA1060169 DK1710301 DK1840302 DD1620101 EA1060169 EA1070061 ED1050501 EA1060169 DK1840302	Ceramic, 0.01 $\mu$ F, $\pm$ 20%, YY Elect., 10 $\mu$ F, 16V Ceramic, 0.01 $\mu$ F, $\pm$ 20%, YY Ceramic, 0.04 $\mu$ F, +100%, -0% Elect., 200pF, $\pm$ 10%, SL Elect., 10 $\mu$ F, 16V Elect., 100 $\mu$ F, 6.3V Elect., 1 $\mu$ F, 50V Elect., 10 $\mu$ F, 16V Ceramic, 0.04 $\mu$ F, +100%, -0%
R217	RT1015214	Carbon, 1.5K $\Omega$ , $\pm$ 10%, 1/4W	C513 C514	DD1620101 EA1070161	Ceramic, 200pF, $\pm$ 10% Elect., 100 $\mu$ F, 16V
R218	RT1033214	Carbon, 3.3K $\Omega$ , $\pm$ 10%, 1/4W			
R219-R220	RT1010214	Carbon, 1K $\Omega$ , $\pm$ 10%, 1/4W			
R221	RT1010414	Carbon, 100K $\Omega$ , $\pm$ 10%, 1/4W			
R222	RT1015114	Carbon, 150 $\Omega$ , $\pm$ 10%, 1/4W			
R223	RT1022114	Carbon, 220 $\Omega$ , $\pm$ 10%, 1/4W			
R224	RT1082114	Carbon, 820 $\Omega$ , $\pm$ 10%, 1/4W			
R225	RT1015114	Carbon, 150 $\Omega$ , $\pm$ 10%, 1/4W			
R226	RT1082214	Carbon, 8.2K $\Omega$ , $\pm$ 10%, 1/4W			
R227	RT1015314	Carbon, 15K $\Omega$ , $\pm$ 10%, 1/4W			
R228-R229	RT1010214	Carbon, 1K $\Omega$ , $\pm$ 10%, 1/4W			
R230	RT1027114	Carbon, 270 $\Omega$ , $\pm$ 10%, 1/4W			
R231	RT1010414	Carbon, 100K $\Omega$ , $\pm$ 10%, 1/4W			
R232	RT1082214	Carbon, 8.2K $\Omega$ , $\pm$ 10%, 1/4W			
R233	RT1015314	Carbon, 15K $\Omega$ , $\pm$ 10%, 1/4W			
R234	RT1015114	Carbon, 150 $\Omega$ , $\pm$ 10%, 1/4W			
R235-R236	RT1010214	Carbon, 1K $\Omega$ , $\pm$ 10%, 1/4W			
R237	RT1015114	Carbon, 150 $\Omega$ , $\pm$ 10%, 1/4W			
R238	RT1010414	Carbon, 100K $\Omega$ , $\pm$ 10%, 1/4W			
R239	RT1015114	Carbon, 150 $\Omega$ , $\pm$ 10%, 1/4W			
R240	RT1047114	Carbon, 470 $\Omega$ , $\pm$ 10%, 1/4W			
R241	RT1010114	Carbon, 100 $\Omega$ , $\pm$ 10%, 1/4W			
R242	RT1047214	Carbon, 4.7K $\Omega$ , $\pm$ 10%, 1/4W			
R243	RT1012314	Carbon, 12K $\Omega$ , $\pm$ 10%, 1/4W			
R244	RT1010214	Carbon, 1K $\Omega$ , $\pm$ 10%, 1/4W			
R245	RT1022214	Carbon, 2.2K $\Omega$ , $\pm$ 10%, 1/4W			
R246	RT1033314	Carbon, 33K $\Omega$ , $\pm$ 10%, 1/4W			
R247	RT1056314	Carbon, 56K $\Omega$ , $\pm$ 10%, 1/4W			
R248	RT1027314	Carbon, 27K $\Omega$ , $\pm$ 10%, 1/4W			
R249-R252	RT1010114	Carbon, 100 $\Omega$ , $\pm$ 10%, 1/4W			
R253	RT1022014	Carbon, 22 $\Omega$ , $\pm$ 10%, 1/4W			
C201-C207	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm$ 20%			
C208	DK1710201	Ceramic, 0.001 $\mu$ F, $\pm$ 20%			

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
H501 H502 H503-H504	HC1000105 HT306441B HD1000105	SEMICONDUCTORS IC TA7060P Transistor, 2SC644S Diode 1N60
J501-J506 J508-J509 L501 P550	YP1000094 YP1000094 LI1018801 YD2820006 (ZZ2818006)	MISCELLANEOUS Plug Plug IFT FM Det. P. C. Board P. C. Board Assembly
R551 R552 R553 R554 R555 R556-R557 R559 R560 R561 R562	RT1056214 RT1010114 RT1027314 RT1010414 RT1010214 RT1033314 RT1033314 RT1033214 RT1056214 RT1018414	RESISTORS Carbon, 5.6K $\Omega$ , $\pm 10\%$ , 1/4W Carbon, 100 $\Omega$ , $\pm 10\%$ , 1/4W Carbon, 27K $\Omega$ , $\pm 10\%$ , 1/4W Carbon, 100K $\Omega$ , $\pm 10\%$ , 1/4W Carbon, 1K $\Omega$ , $\pm 10\%$ , 1/4W Carbon, 33K $\Omega$ , $\pm 10\%$ , 1/4W Carbon, 33K $\Omega$ , $\pm 10\%$ , 1/4W Carbon, 3.3K $\Omega$ , $\pm 10\%$ , 1/4W Carbon, 5.6K $\Omega$ , $\pm 10\%$ , 1/4W Carbon, 180K $\Omega$ , $\pm 10\%$ , 1/4W
R563-R564 R578	RT1010114 RT1010114	Carbon, 100 $\Omega$ , $\pm 10\%$ , 1/4W Carbon, 100 $\Omega$ , $\pm 10\%$ , 1/4W
C551 C552 C553 C554 C555 C556 C558 C559 C560-C561 C562	DD1615001 DF1668301 DF1740301 EA1060162 DK1840302 DK1810402 DK1810402 EA1060162 DK1710301 DK1840302	CAPACITORS Ceramic, 15pF, $\pm 10\%$ , SL Mylar, 0.068 $\mu$ F, $\pm 10\%$ Mylar, 0.04 $\mu$ F, $\pm 20\%$ Elect., 10 $\mu$ F, 16V Ceramic, 0.04 $\mu$ F, +100%, -0% Ceramic, 0.1 $\mu$ F, +80%, -20% Ceramic, 0.1 $\mu$ F, +80%, -20% Elect., 10 $\mu$ F, 16V Ceramic, 0.01 $\mu$ F, $\pm 20\%$ Ceramic, 0.04 $\mu$ F, +80%, -20%
H551 H552-H553 H554-H555	HT307331C HT3037210 HD1000105	SEMICONDUCTORS Transistor, 2SC733 Gr Transistor, 2SC372 Diode, 1N60
L551 J551-J561	LC2105001 YP1000094	MISCELLANEOUS Choke Coil, 1mH Plug



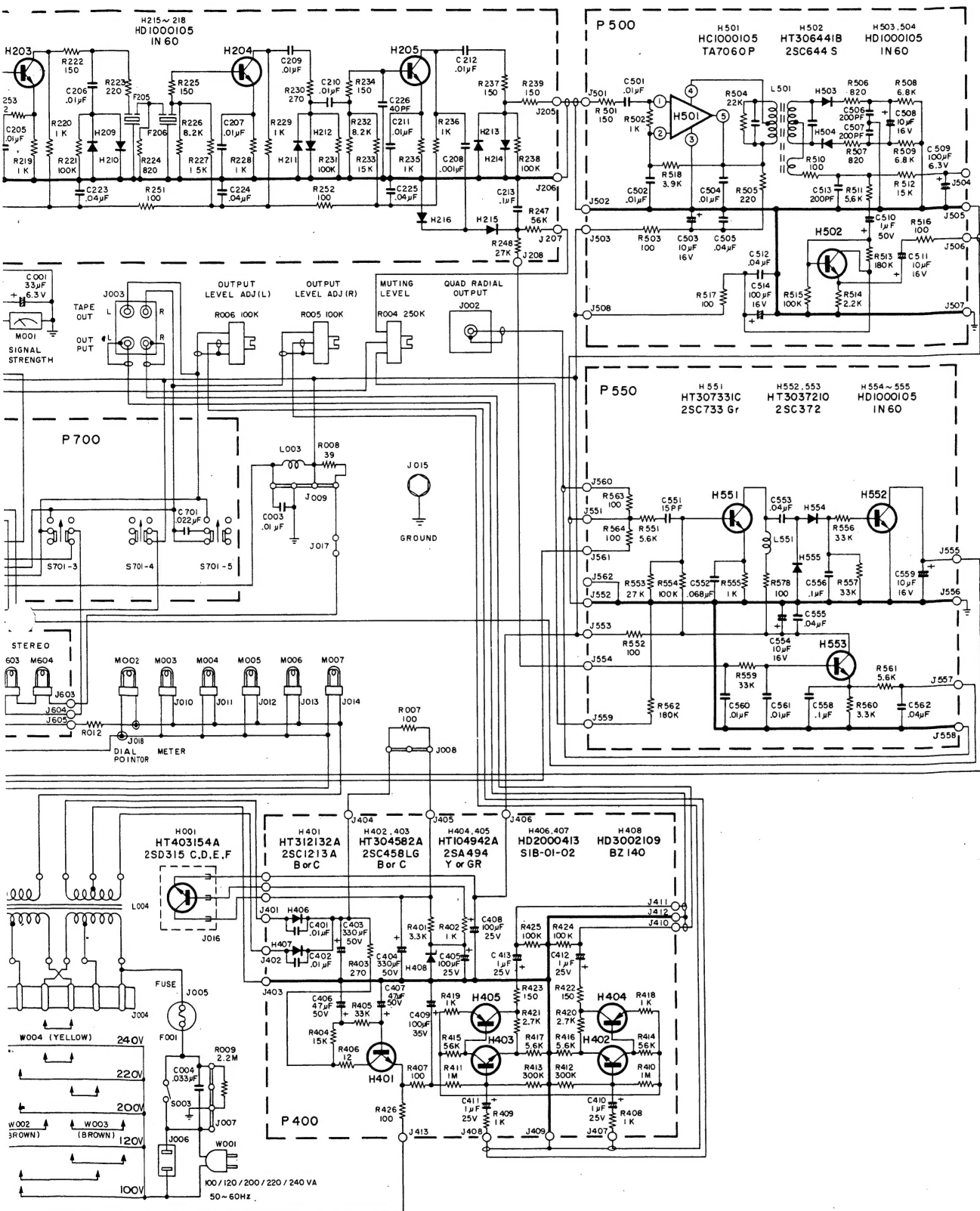


Figure 1. Schematic Diagram

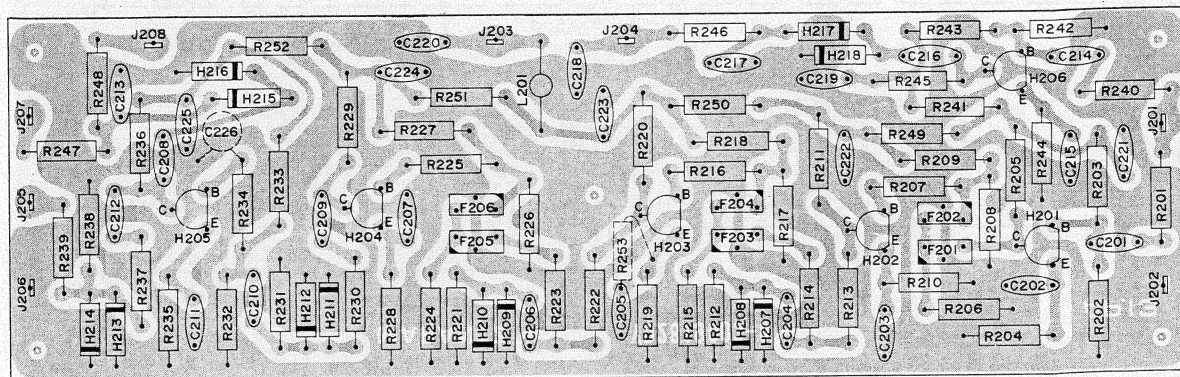


Figure 2. FM IF Amplifier Assembly P200 Component Locations

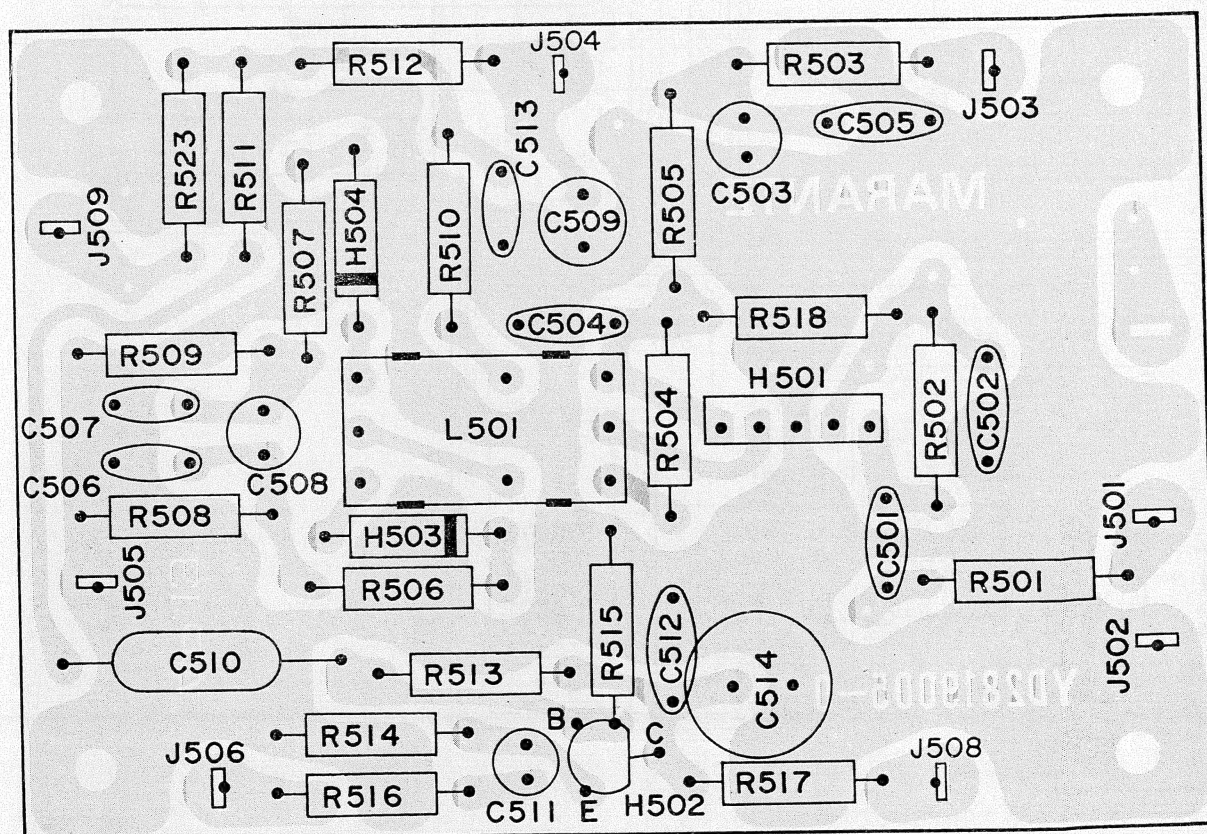


Figure 3. FM Detector Assembly P500 Component Locations

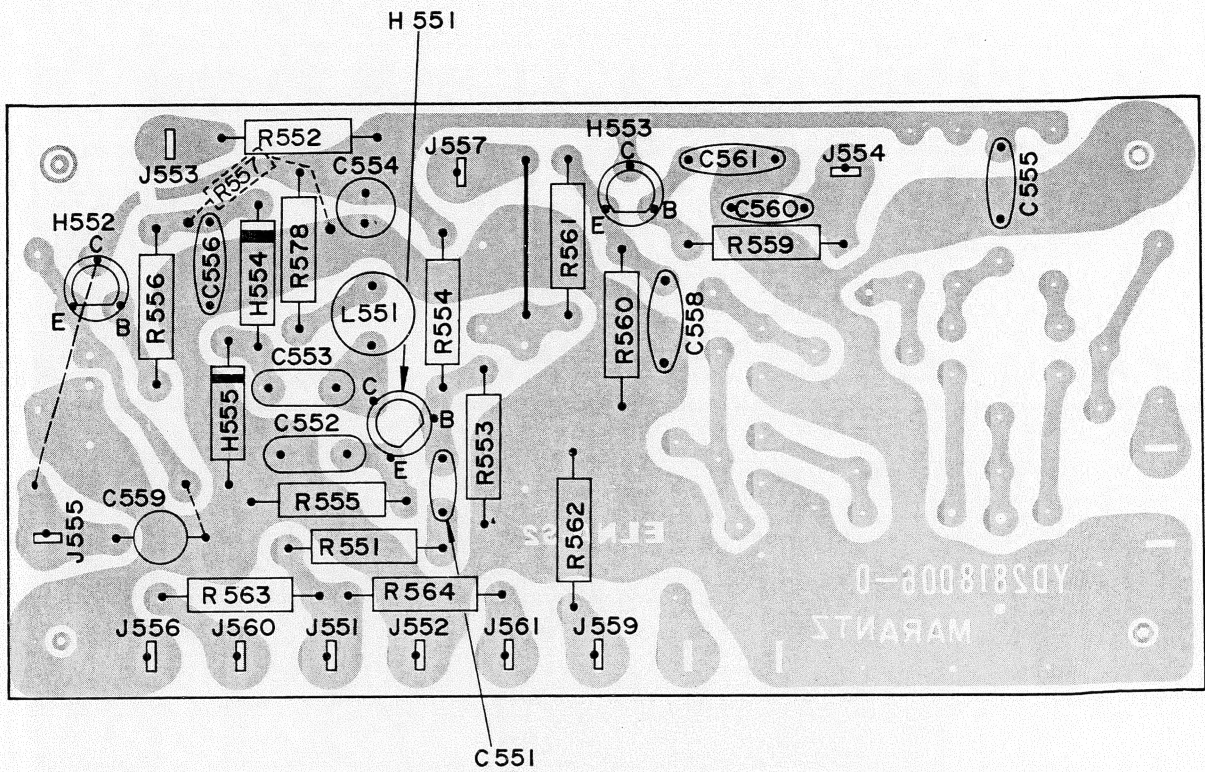


Figure 4. Muting Control Amplifier Assembly P550 Component Locations

## **1. INTRODUCTION**

This service manual was prepared for use by Authorized Warranty Stations and contains service information for Marantz Model 110 Stereophonic Tuner.

Servicing information and voltage data included in this manual are intended for use by the knowledgeable and experienced technician only. All instruction should be read carefully. No attempt should be made to proceed without a good understanding of the operation in the receiver.

The part lists furnish information by which replacement part may be ordered from the Marantz Company. A simple description is included for parts which can be usually be obtained through local suppliers.

The Model 110 is a tuner version of the Marantz's Model 2245 Tuner/Amplifier and almost the same circuitry as used in the Model 2245 is employed except the audio Amplifier, and power supply circuit.

## **2. AM Tuner**

All components except Tuning capacitor and ferrite bar antenna are mounted on a printed circuit board P150.

The AM signals induced in a ferrite bar antenna are applied to the base of RF amplifier transistor H151 through a capacitor of C151 and amplified to the level required for overcoming the conversion noises, thus giving good S/N performance. The tuned circuits inserted in both out- and in-put circuit of the RF amplifier assure very high image and spurious rejection performance. Thus amplified and selected AM signals are then applied to the base of converter transistor H152 through a coupling capacitor C156. While the local oscillator voltage is injected to the emitter of H152 through a capacitor C157. Both AM signals and oscillating voltage are mixed at the base-emitter junction and converted into 455KHz intermediate frequency. The resulting IF signal is applied to the first IF transformer L153 consisting of one ceramic filter and two tuned circuits.

The output of L153 is led to the transistor H153 which in turn apply its output to the transistor of next stage H154. The fully amplified IF output is then applied to the diode H157 to detect audible signal through the detector transformer L154. The detected audio signal is filtered and amplified and the final audio output is obtained from the collector of H155 and applied: to the tape out jacks and the function switch.

The DC component of the detected IF signal is used as a AGC voltage to control emitter current of H153 which in turn control the bias current of the RF amplifier through the resistor R179 and R151. A part of IF signal output is also applied to the diode H158 through a capacitor C167 and rectified to obtain DC current for energizing the AM signal strength meter MO01.

### **2.1 Suggestions for AM Tuner trouble shooting**

Check for broken AM bar antenna, next try to tune station by rotating fly-wheel tuning knob slowly and observe the AM signal strength meter whether it deflects or not. If the signal strength meter gives a deflection at several frequencies received, no failure may exist in the stages at least preceding final IF transformer L154. Next connect a oscilloscope to the pin terminal J162 or J157 and check for audio signals with the tuning meter deflected. If the signal strength meter does not deflect, check the local oscillator circuit. Normal oscillating voltage at the hot end of the oscillator tuning capacitor is about 2 or 3 volts, varying with tuning capacitor position. When measuring oscillating voltage use a RF VTVM, no circuit tester gives correct indication. If the local oscillator voltage is normal, check all voltage distribution in the AM circuits by using a DC VTVM and compare the measured values with those given in the schematic diagram.

### 3. FM Tuner

The FM Tuner section of Model 110 is divided into five functional blocks: FM Front End, IF Amplifier, Detector, Muting Control and MPX Stereo Decoding Circuit.

FM signals induced by a FM antenna are led to FM antenna coil L101 through an attenuator switch and a Balun coil. These signals are then applied to the FET RF amplifier which in turn applies its output to the next FET Mixer H102 through the double tuned high selective circuits. The FET Mixer convert its input signal into 10.7 MHz intermediate frequency and amplifies it at the same time. The H103 is a local oscillator and its output is injected into the source of the FET Mixer, the injection voltage is about 700mV. The 10.7 MHz front end output is led to the next IF amplifier unit through a coaxial cable.

The IF amplifier unit consists of five stages of IF amplifier and one stage of AGC amplifier. Six pieces of ceramic filters are also used to obtain high selectivity, four stages of symmetrical diode limiters are also employed for the best limiting characteristics, improved capture ratio and good AM suppression.

A part of FM Front End output is applied to the AGC amplifier H206 and rectified its output is fed back to the gate of FET RF amplifier to decrease the gain with increased signal strength.

The IF signal sufficiently amplified through every stage of IF amplifier is finally applied to the IC limiter on the Detector Unit. The detected audio output is led to the buffer amplifier H502 and its buffered output is led to; (a) noise amplifier H551 through resistor R551 and capacitor C551, (b) Quad Radial Jack on the rear panel through resistor R564, (c) MPX stereo decoding circuit through R563.

#### 3.1 Audio Muting and Stereo mode auto-selecting circuit

The muting circuit consisting of all solid-state electrical switching has been incorporated in the Model 110. Two inputs control the muting function. The first is related to signal strength, the second to the noise condition at the detector. These inputs are properly matrixed and gated to provide muting free from noise and transients.

The first input of DC voltage obtained by rectifying a part of IF output signal from the H205 is applied to the base of H306 and turns on it, if the IF output is greater than predetermined level (muting threshold level). When the H306 is turned on the H307 is turned off, allowing the emitter-collector resistance increasing and the collector voltage rises about 9.0V. The increased collector voltage increases the gate bias voltage and turns on the switching FET H308, decreasing the source-drain resistance to near zero ohm and allowing the audio signal applied to the source to flow to the center of 38 KHz switching transformer through the source-drain path.

When the input signal is lower than predetermined level, the DC output obtained is small and can not turn on the H306, thus the H306 keeps its turn-off state and this makes H307 turn on, decreasing the collector voltage and turning off H308. Thus no audio signals can pass through the FET. This is the fundamental principle of the muting operation but for more elaborate muting operation the second input is necessary.

The second input is used to protect the muting operation and MPX stereo beacon lamps from misoperation due to undesirable noises. The high frequency noises included in the detected audio signals are separated by a small capacitor C551 and amplified by the noise amplifier transistor H551 and its output is rectified by the two diodes. The rectified DC output is proportional to the noise components in the audio signals.

When there are excessive noises in the audio signals such as obtained with a station incorrectly tuned in, the rectified DC output turns on the transistor H522, decreasing the emitter-collector resistance to zero. This means the collector of H307 is short-circuited to the ground, therefore the H308 is turned off and any audio signals having excessive high frequency noises can not go through the FET's source-drain path.

The transistor H303 connected in series with the 19 KHz pilot signal amplifier transistor H302 is also turned off and no current flows in the H302, resulting in turning off the stereo beacon lamps. Thus misoperation due to undesirable noises is also avoided.

### 3.2 MPX Stereo Decoding Circuit

The buffered and non-equalized audio signals are applied to the first amplifier H301 which serve as a tuned amplifier for the pilot signal in the composite signals and as a buffer amplifier for the audio signals. The amplified 19 KHz pilot signal is led to the second 19 KHz amplifier H302 and further amplified if switching transistor H303 is turned on by the controlling DC signal as described in the preceding chapter. The final 19KHz pilot signal is rectified by the doubler circuit consisting of the H315 and H316 to obtain synchronized 38 KHz amplifier driving signal.

The H304 is the 38 KHz tuned amplifier and supplies its output to the switching matrix circuit consisting of four diodes. While the composite signals are applied to the center tap of switching transformer 1/2 L302. The right and left stereo signals decoded by the switching circuit are led to the crosstalk cancelling amplifier which utilizes complementary configuration with NPN and PNP transistors through de-emphasis network consisting of C315 and 335, and C316 and R336. L305 is a low-pass filter networks having very sharp cut off characteristics and eliminates undesirable residual switching signals. Transistors H313 and H314 are buffer amplifiers and their outputs are led to the function switch.

### 3.3 Suggestion for Trouble Shooting of FM Tuner

#### 3.3.1 Symptom: No. FM Reception

First turn on the Power switch and try to tune FM stations. Rotate the fly-wheel tuning knob slowly and observe the FM signal strength meter. If the signal strength meter deflect at several frequencies received, the tuner circuits preceding the discriminator circuit may have no failure. When no reading is obtained in the meter, check FM local oscillator circuit, using a RF VTVM. The normal local oscillator voltage is one or two volts (rms) at the tuning capacitor, depending on the tuning capacitor position. If the local oscillator voltage is normal, next check all voltage distribution in the FM Front End and IF amplifier unit and compare them with those shown in the circuit diagram. When signal strength meter deflects but no sound is obtained, check audio circuits, using high sensitive oscilloscope.

#### 3.3.2 Symptom: No Stereo Separation

First check the "MONO" switch is in normal out position. Connect a FM RF signal generator output modulated by a stereo modulator to the rear FM antenna terminals, and check the stereo beacon is turned on or not. If not turned on, check for 19 KHz pilot signal and 38 KHz switching signal, using an oscilloscope.

## 4. AM Alignment Procedure

### 4.1 AM IF Alignment

1. Connect a sweep generator to the J151 and an alignment scope to the J162.
2. Rotate each core of IF transformer L153 and L154 for maximum height and flat top symmetrical response.

### 4.2 AM Frequency Range and Tracking Alignment

1. Set AM signal generator to 525 KHz. Turn the tuning capacitor fully closed (place the tuning pointer at the low end.) and adjust the oscillator coil L152 for maximum audio output.
2. Set the signal generator to 1650 KHz. Place the tuning pointer in the high frequency end and adjust the oscillator trimmer on the oscillator tuning capacitor for maximum audio output.
3. Repeat the step 1 and 2 until no further adjustment is necessary.
4. Set the generator to 600 KHz and tune the receiver to the same frequency and adjust a slug core of AM ferrite rod antenna and RF coil L151 for maximum output.
5. Set the generator to 1400 KHz and tune the receiver to the same frequency and adjust both trimming capacitors of Antenna and RF tuned circuit for maximum output.
6. Repeat the step 4 and 5 until no further adjustment is necessary.

Note: During tracking alignment reduce the signal generator output as necessary to avoid AGC action.

## 5. FM Alignment Procedure

1. Connect a FM signal generator to the FM antenna terminals and a oscilloscope and an audio distortion analyzer to the tape output jacks on the rear panel.
2. Set the FM SG to 87.5 MHz and provide about 3 to 5  $\mu$ V. Place the tuning pointer at the low frequency end by rotating the tuning knob and adjust the core of oscillator coil L104 to obtain maximum audio output.
3. Set the FM SG to 108.5 MHz and provide about 3 to 5  $\mu$ V output. Rotate the tuning knob and place the tuning pointer at the high frequency end and adjust the trimming capacitor C106 for Maximum output.
4. Repeat the step 2 and 3 until no further adjustment is necessary.
5. Set the FM SG to 90 MHz and tune the receiver to the same frequency. Decrease signal generator output until the audio output level decreases with the decreasing generator output. Adjust the antenna coil L101, RF coil L102 and L103 and IF transformer L105 for minimum audio distortion.
6. Set the FM SG to 106 MHz and tune the receiver to the same frequency. Adjust the trimming capacitor C102, C104 and C105 for minimum distortion.
7. Adjust the secondary core (black) of discriminator transformer L501 so that the center tuning meter pointer indicates its center at no signal applied. Set the FM SG to 98 MHz and increase its output level to 1 K $\mu$ V and tune the receiver to the same frequency so that the center tuning meter pointer indicates its center. Adjust the primary core (pink) of L501 for minimum distortion.

### 5.1 STEREO Separation Alignment

1. Set the FM SG to provide 1 K $\mu$ V at 98 MHz. Tune the receiver to the same frequency so that the center tuning meter pointer indicates its center.
2. Modulate the FM SG with stereo composite signal consisting of only subchannel signal (of course a pilot signal must be included). Adjust the core of L301 for maximum audio output, then, modulate the signal generator with a stereo composite signal consisting of only L channel signal and again adjust the core of L301 for maximum audio output.
3. Adjust the trimming resistor R365 for maximum and same separation in both channels.

### 5.2 Muting Circuit Alignment

1. Connect a VTVM across the resistor R002 and adjust the resistor R022 until the meter reads 0.75V DC at no signal.
2. Set the FM SG to provide 1 K $\mu$ V at 98 MHz and tune the receiver to the same frequency correctly.
3. Turn on MUTING push-switch. Shift the FM signal generator frequency to plus and minus and note both plus and minus shifted frequencies at which undesirable audio side responses are muted out. Adjust the R022 so that the same shifted frequencies mute the undesirable side response.

## 6. Test Equipment Required for Servicing

Table 1 lists the test equipment required for servicing the Model 110 Tuner.

Item	Manufacturer and Model No.	Use
AM Signal Generator	Less than 0.3% distortion	Signal source for AM alignment
Test Loop		Used with AM Signal generator
FM Signal Generator		Signal source for FM alignment
Stereo Modulator	Less than 0.3% distortion	Stereo separation alignment and trouble shooting
Audio Oscillator	Weston Model CVO-100P, less than 0.02% residual distortion is required.	Sinewave and squarewaves signal source.
Oscilloscope	High sensitivity with DC horizontal and vertical amplifiers.	Waveform analysis and Trouble Shooting, and ASO alignment.
VTVM	With AC, DC, RF range	Voltage measurements.
Circuit Tester		Trouble Shooting

## 7. Voltage Conversion

This model is equipped with a universal power transformer to permit operation at 100, 120, 200, 220 and 240 V AC 50 to 60 Hz.

To convert the the Model 110 to the required voltage perform the following steps:

- (1) Remove the top cover.
- (2) Remove the Transformer Wire Connection Terminal Cover, loosen two Cover mounting screws on the rear panel, see Fig. 1.
- (3) Change the jumper wires as illustrated in Fig. 2. for the required AC voltage and replace the fuse as instructed.

**CAUTION: DISCONNECT POWER SUPPLY CORD FROM AC OUTLET BEFORE CONVERTING VOLTAGE.**

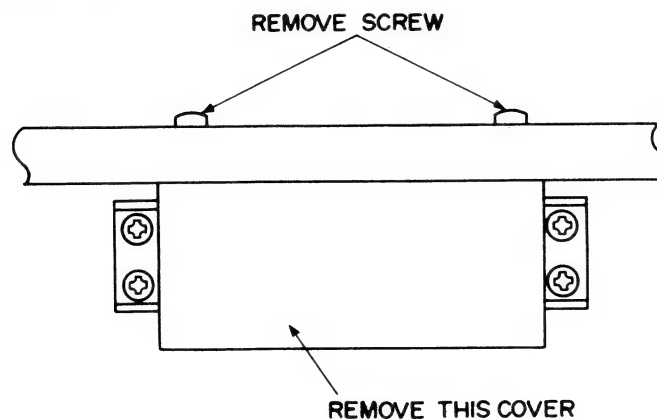
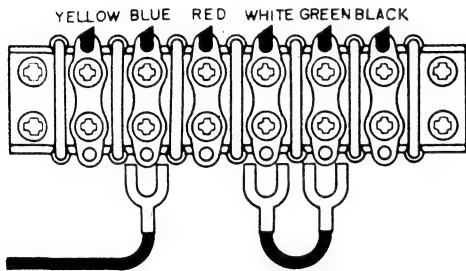
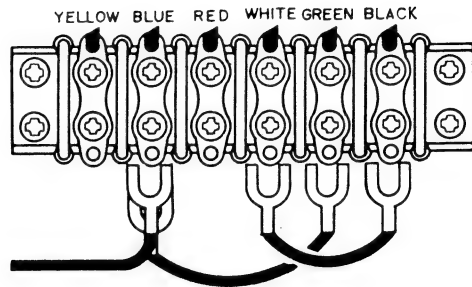


Figure 1. Remove the Terminal Cover

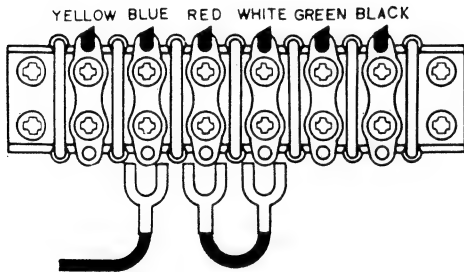
For 200V Operation  
(Use 3/10A Fuse )



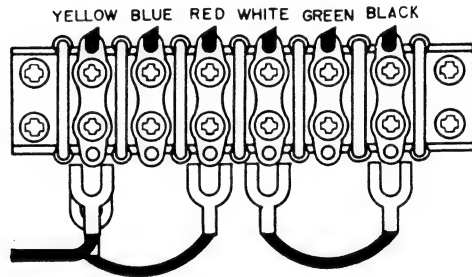
For 100 V Operation  
(Use 0.5A Fuse )



For 220V Operation  
(Use 3/10A Fuse )



For 120 V Operation  
(Use 0.5A Fuse )



For 240V Operation  
(Use 3/10A Fuse )

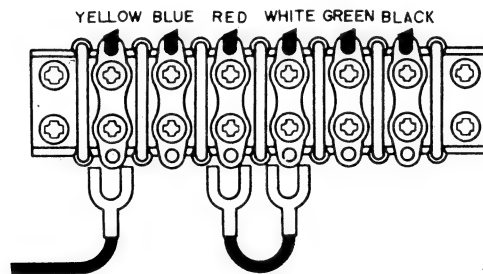


Figure 2. Voltage Conversion Chart

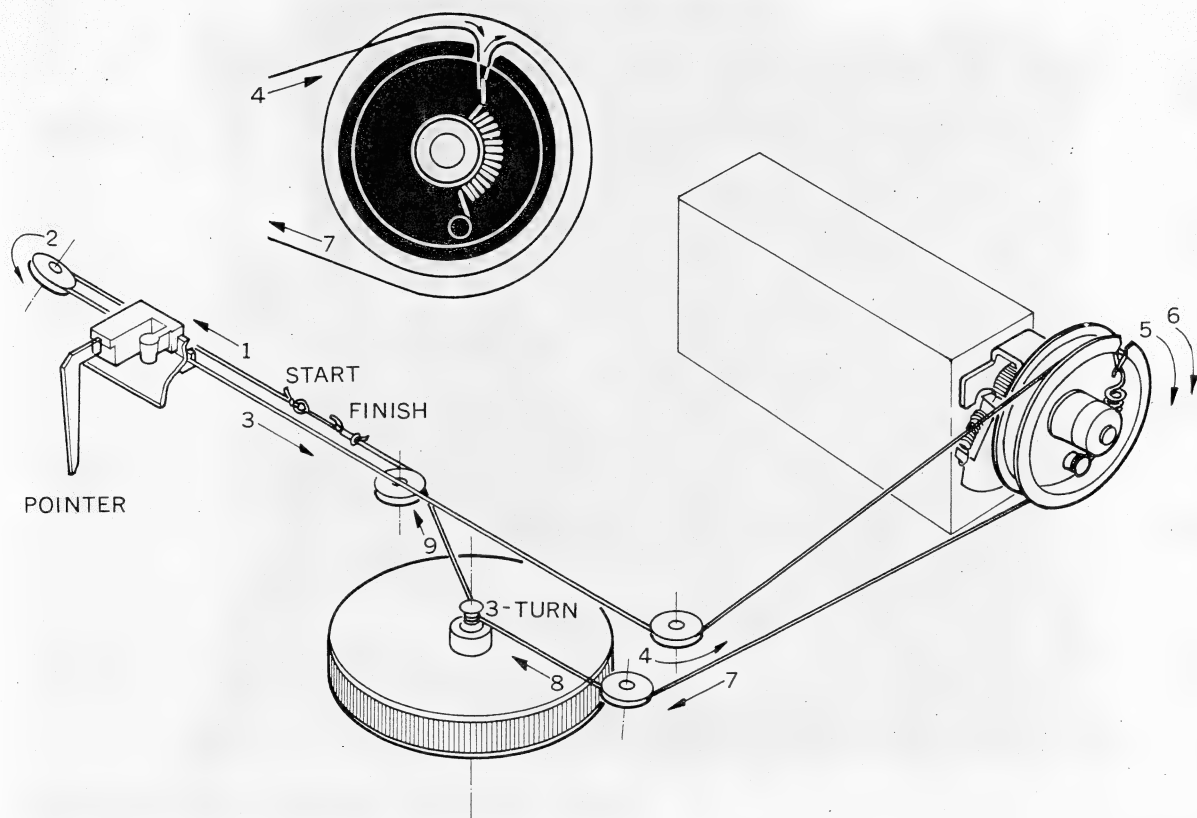


Figure 3. Dial Stringing

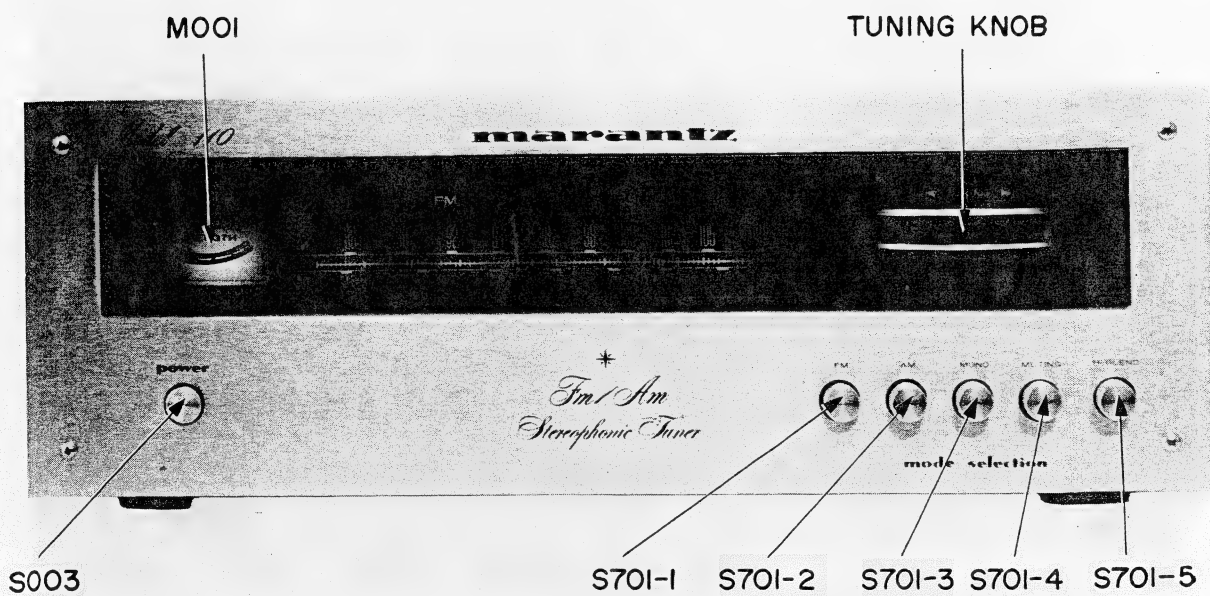


Figure 4. Front Panel Adjustment and Component Locations

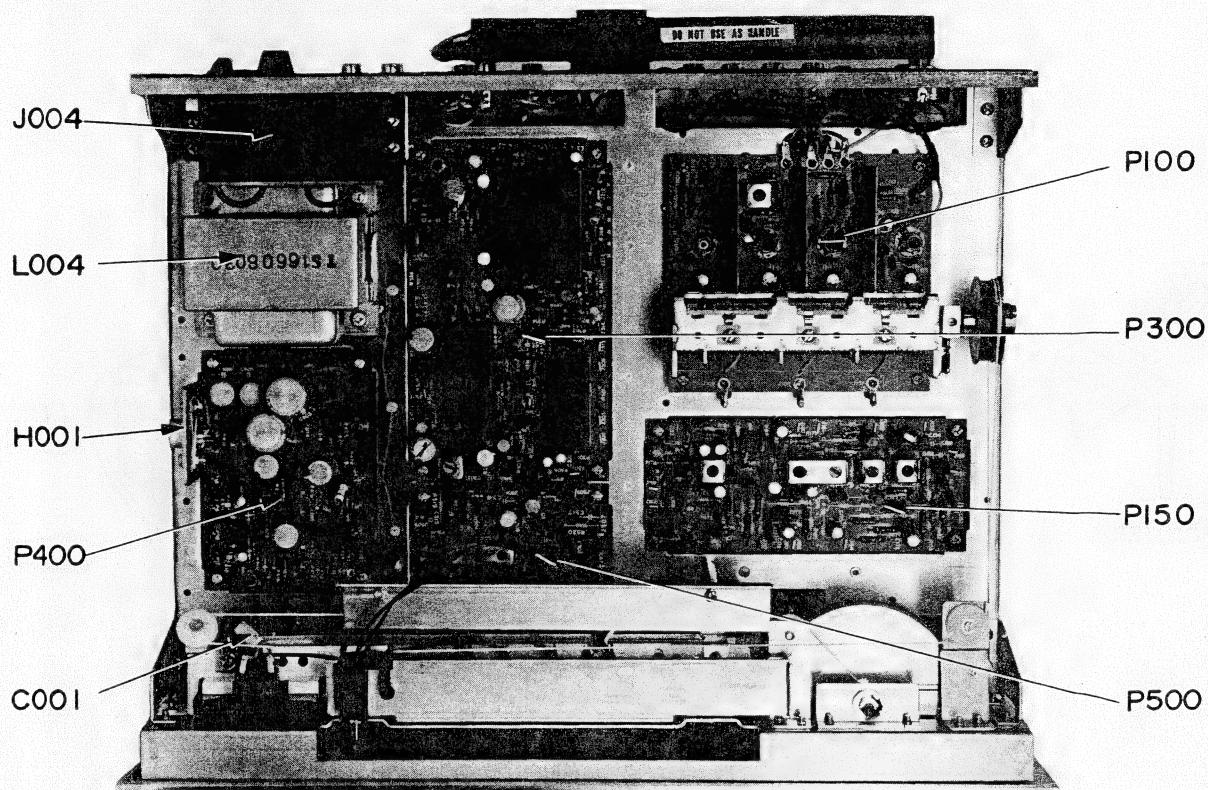


Figure 5. Main Chassis Component Locations (Top View)

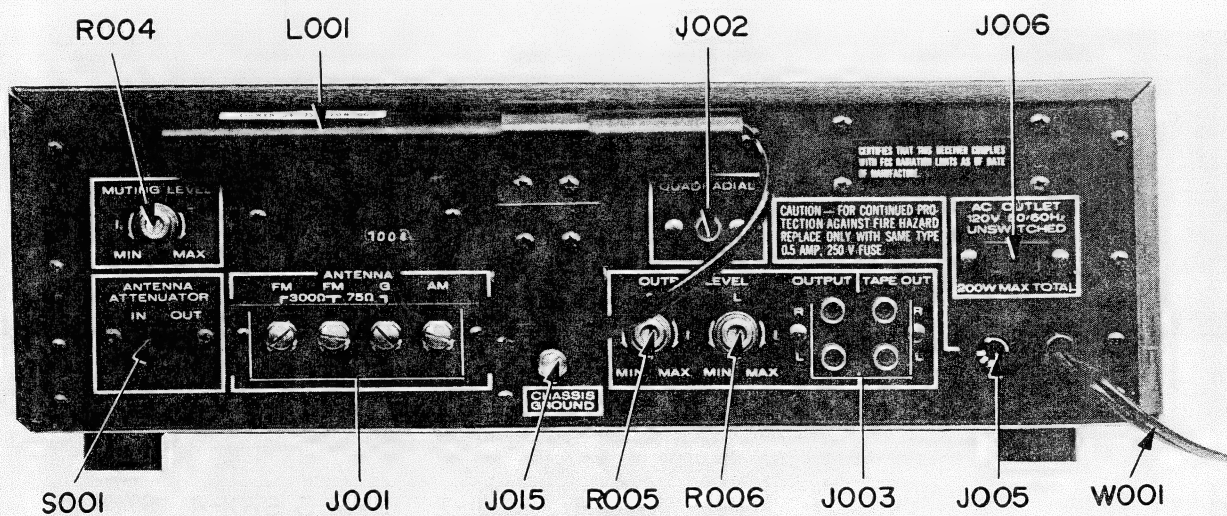


Figure 6. Rear Panel Adjustment and Component Locations

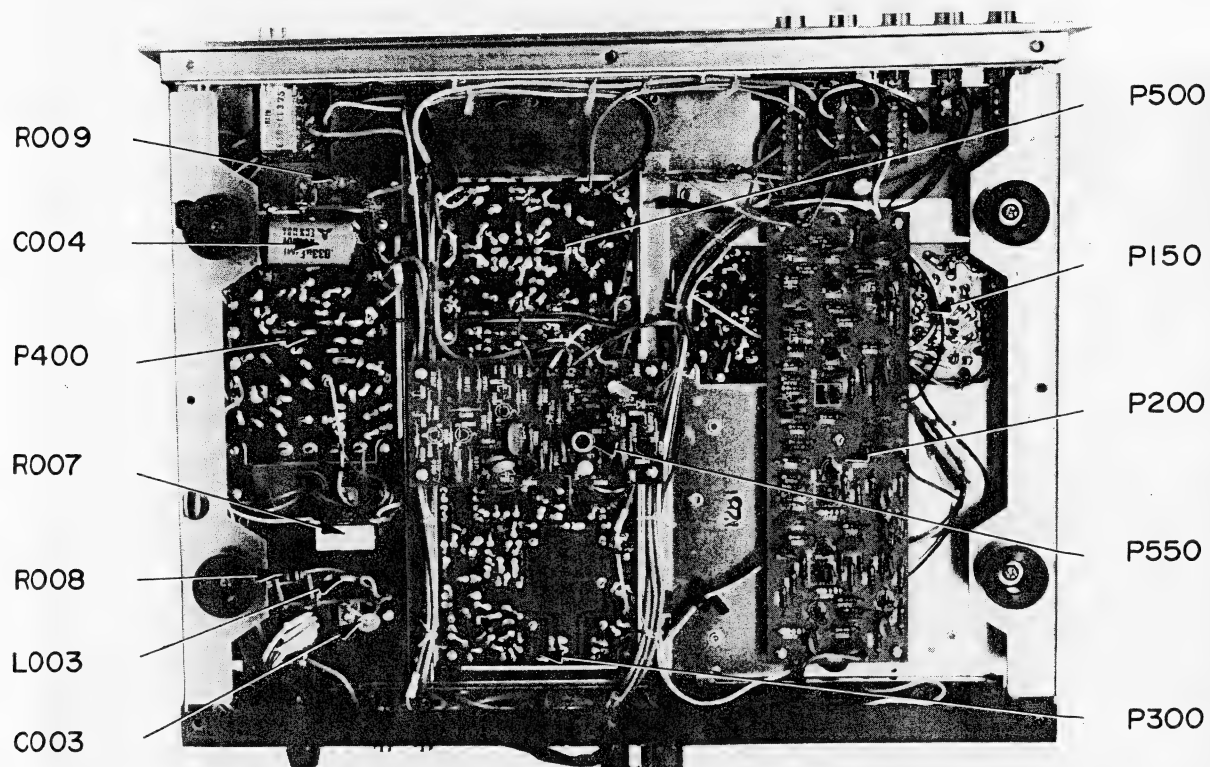
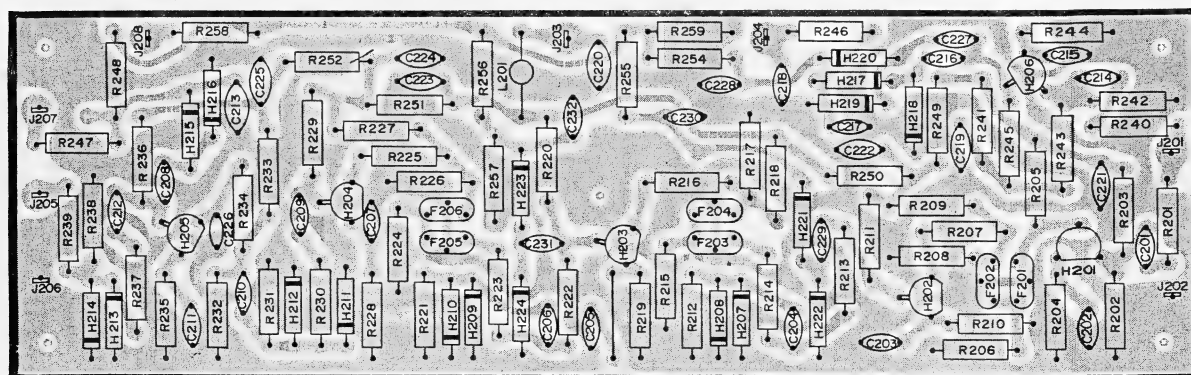
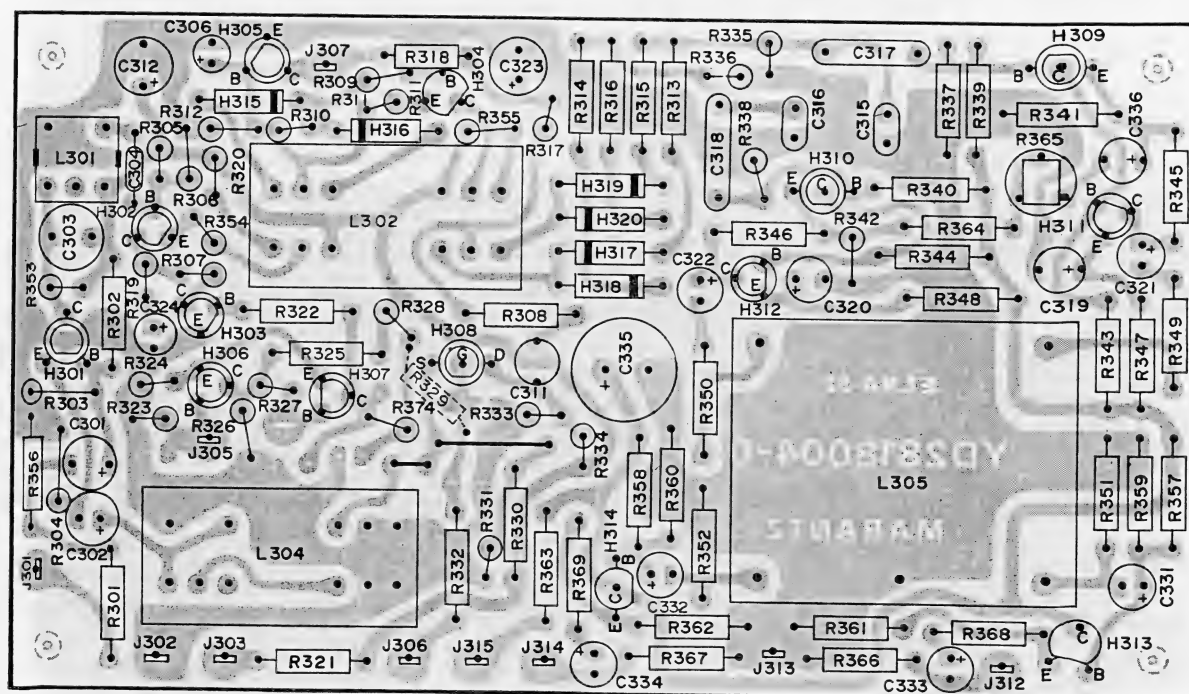
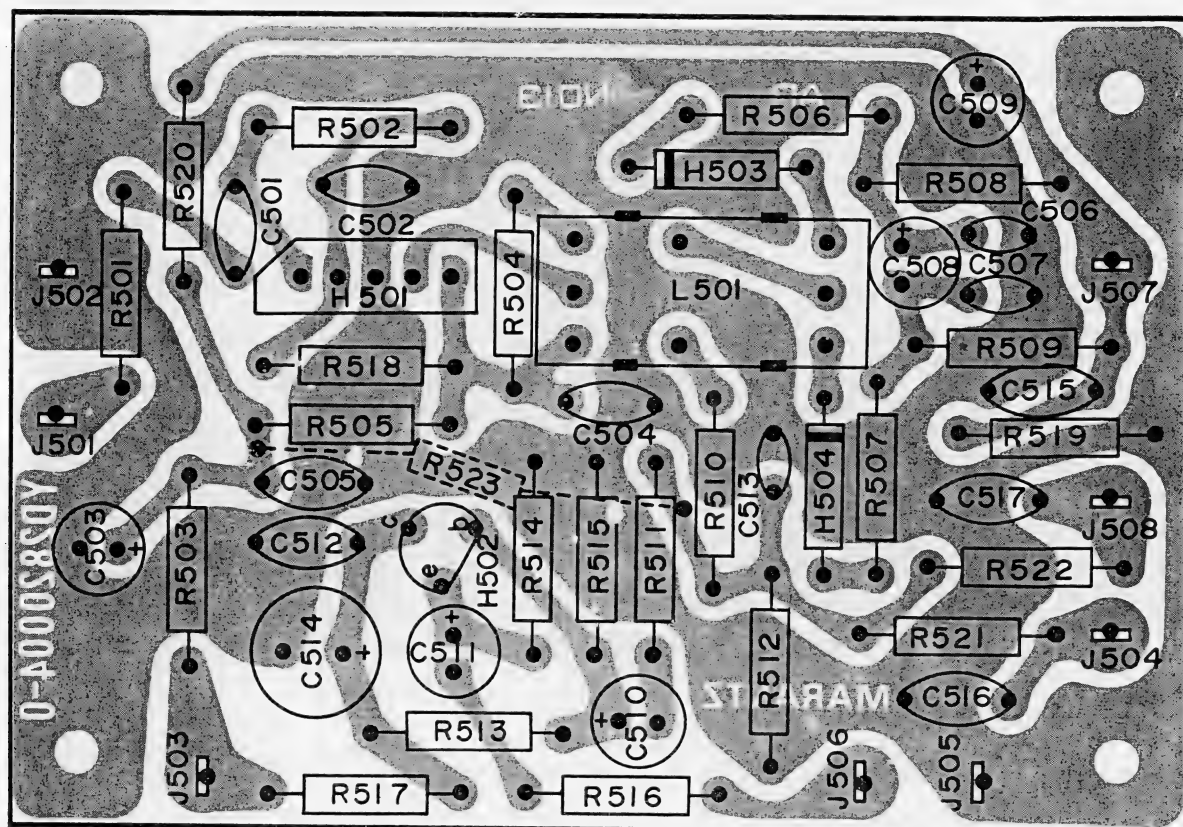


Figure 7. Main Chassis Component Locations (Bottom View)





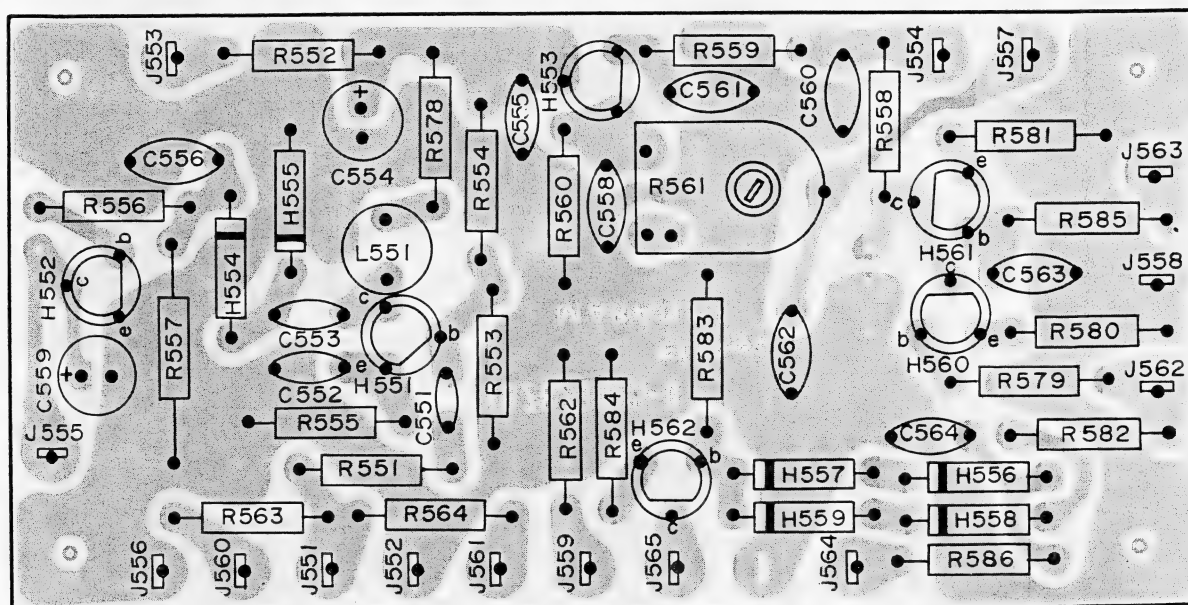


Figure 12. Muting Control Amplifier Assembly P550 Component Locations

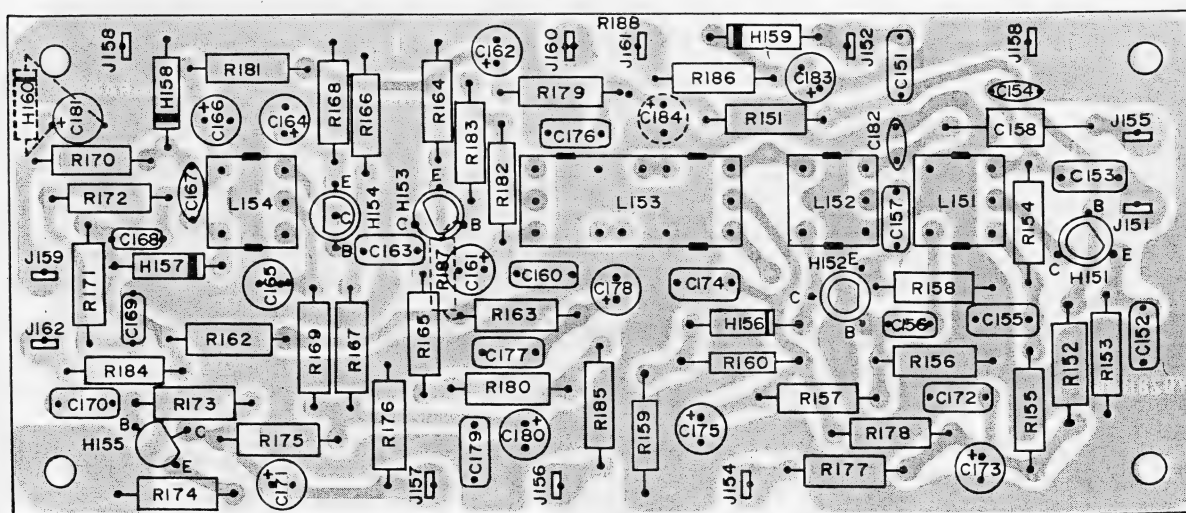


Figure 13. AM Tuner Unit Assembly P150 Component Locations

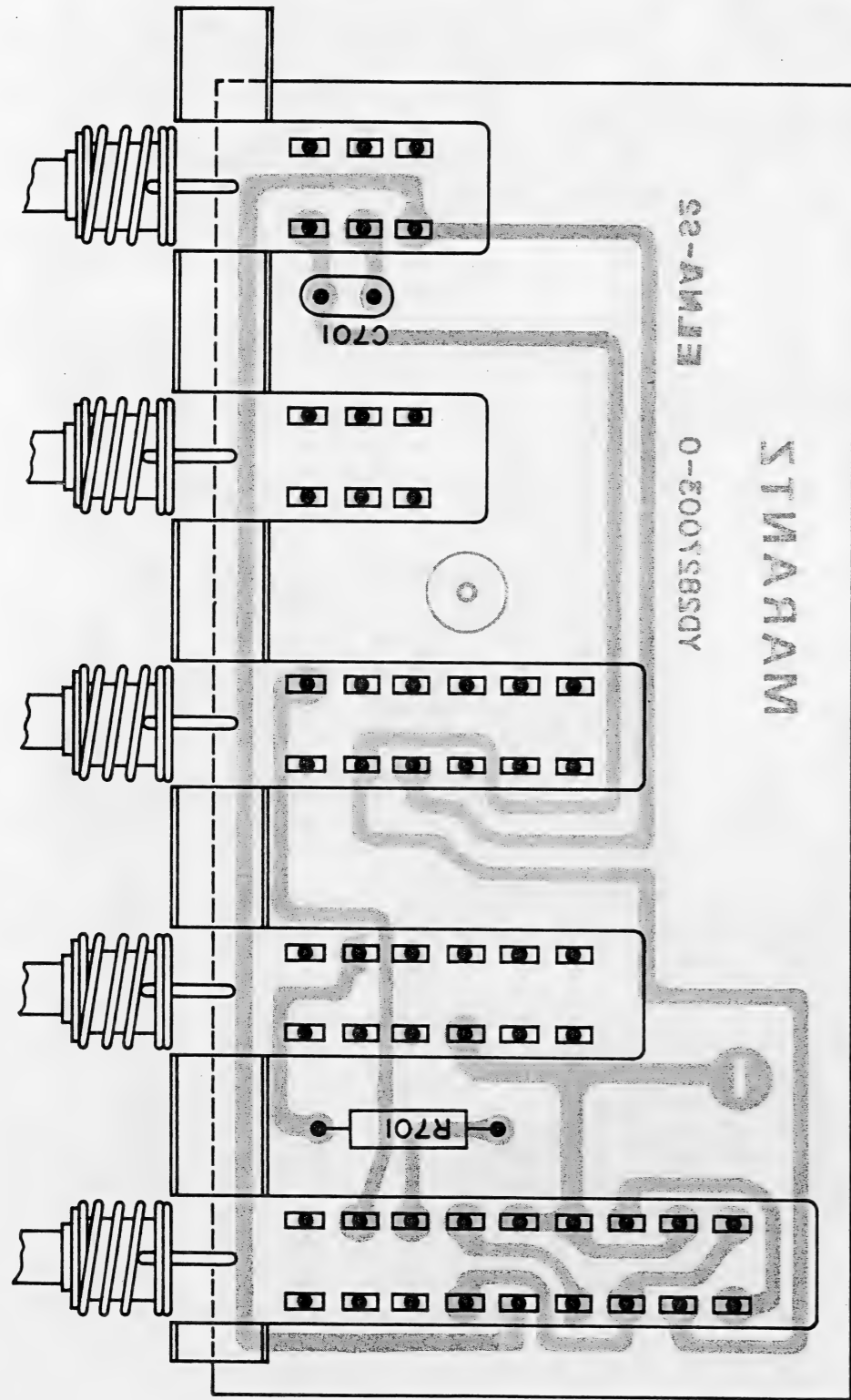


Figure 14. Mode Selection Switch Unit Assembly P700 Component Locations

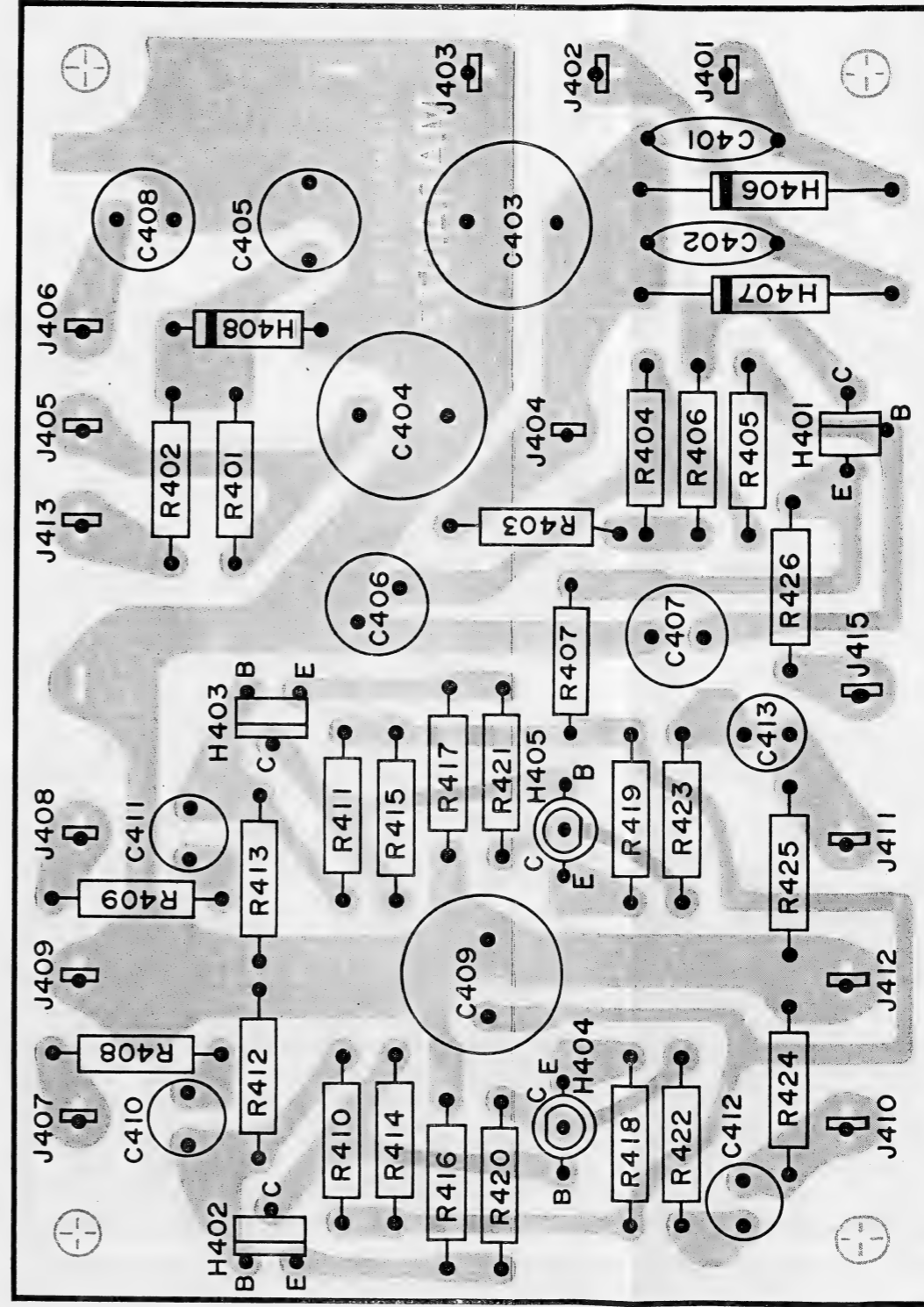
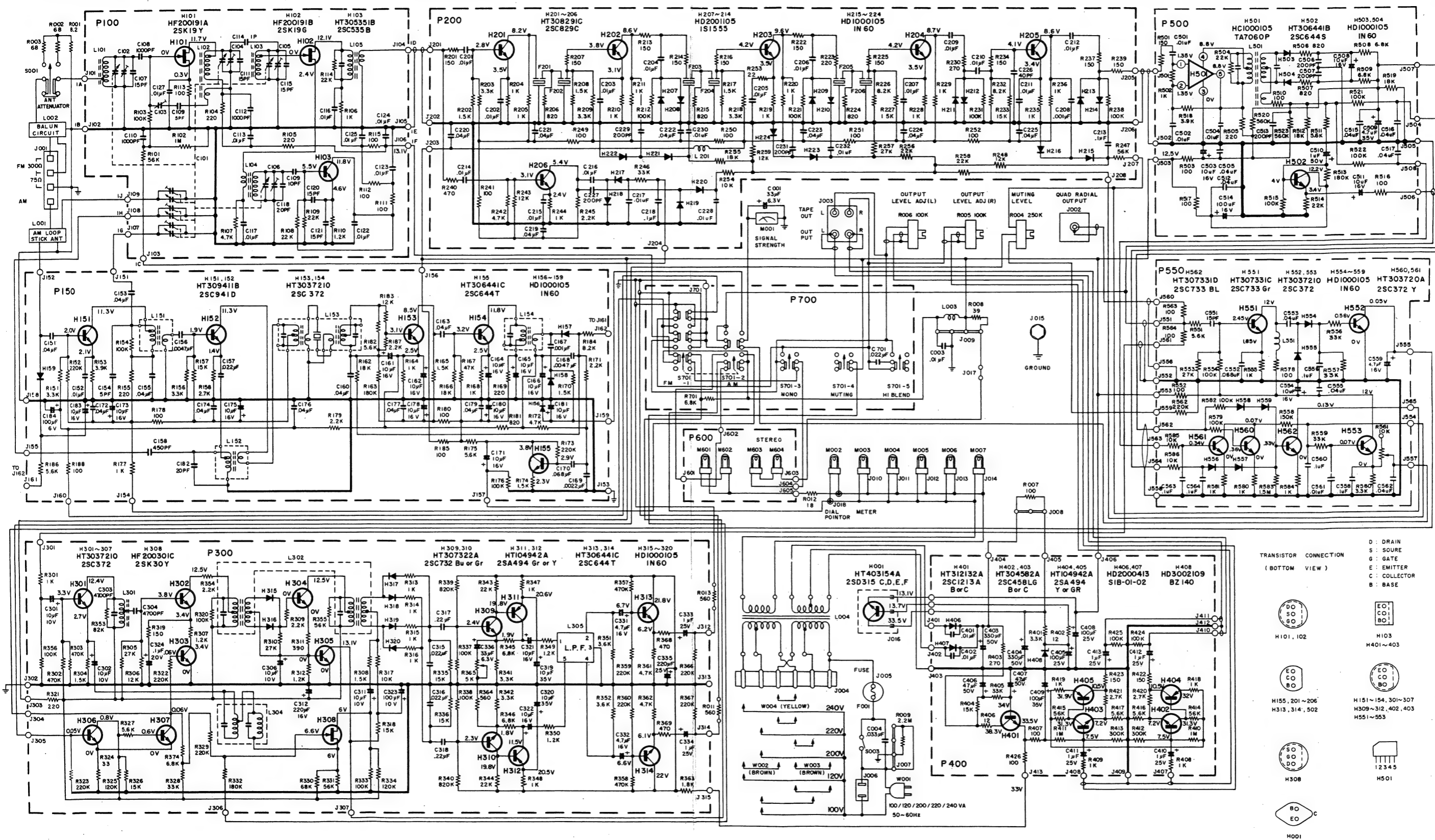


Figure 15. Pre-Amplifier and Power Supply Assembly P400 Component Locations



**Figure 16. Schematic Diagram**

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
A	282740140	Frame assembly
0101	282706301	Escutcheon
0102	282740101	Frame
0103	282715801	Window
0105	282705301	Cover
0621	51122608E	T H M screw x 4
B	282716040	Rear bracket assembly
0124	282716002	Bracket x 2
0531	51100308S	B H M screw x 2
0532	51100308S	B H M screw x 2
0533	55060307F	T R rivet x 2
0534	54050300R	T L washer OR x 2
J002	YT0201006	Terminal, 1P
J003	YT0204003	Terminal, 4P
J006	YJ0400018	Jack, AC outlet
C	282727340	Fly wheel assembly
0117	257706302	Escutcheon
0118	257706303	Escutcheon
0119	257727301	Fly wheel
0313	282711201	Shaft
0415	53110603A	Hexagon nut
0416	54040602A	Spring washer
D	282710340	Pointer assembly
0113	281810301	Pointer
0114	281810302	Pointer
0115	281805301	Cover
M002	IN1008018	Lamp, 8V
E	282700640	Dial string assembly
0328	120225801	Hook
0329	72081602A	String 160
0435	56382040G	Eyelet
0104	281825905	Bush
0107	281815401	Knob x 5
0109	281815402	Knob
0111	282730201	Dial
0112	282705302	Cover
0121	282725701	Lid
0122	282825702	Lid
0129	282726501	Indicator
0130	257816052	Bracket K
0134	281927103	Holder
0135	53228059E	Nut x 3
0201	145525901	Bush
0202	275905701	Leg x 4
0203	282706302	Escutcheon
0210	280312001	Insulator
0211	282710550	Chassis K x 2
0216	282716004	Bracket x 2
0217	282716005	Bracket x 2
0219	282726901	Protector
0220	282710101	Support x 2

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
0221	282715901	Drum
0222	71101679M	Spring
0223	281905102	Guide
0225	273010903	Shield x 3
0226	273025901	Bush x 3
0227	138200503	Glamper x 5
0228	257700502	Glamper x 10
0229	281816006	Bracket
0230	282126902	Protector
0231	282716050	Bracket K
0235	282112001	Insulator
0301	282716003	Bracket
0304	282705101	Guide
0306	257710602	Bearing
0307	141511801	Spacer
0309	281810650	Bearing K
0315	282727401	Reflector
0316	281827101	Holder
0318	282716006	Bracket
0319	282716007	Bracket
0320	263711203	Shaft x 2
0322	282716051	Bracket K
0326	257726201	Pulley x 4
0330	257711803	Spacer x 2
0332	282725901	Bush
0333	282711801	Spacer x 4
0334	282710701	Sheet
0335	282710702	Sheet x 2
0401	51570306B	P H tapt screw x 8
0402	51570306B	P H tapt screw x 5
0403	51570306B	P H tapt screw x 8
0404	51570306B	P H tapt screw x 2
0405	51570306B	P H tapt screw x 3
0406	51570306B	P H tapt screw x 2
0407	51570306B	P H tapt screw x 2
0408	51570306B	P H tapt screw x 2
0409	51570306B	P H tapt screw x 2
0410	51570306B	P H tapt screw x 2
0411	51570306B	P H tapt screw x 2
0412	51040306A	F H M screw x 2
0413	51570306B	P H tapt screw x 2
0414	51040306A	F H M screw x 2
0417	51640412D	Set screw CP
0418	54040402A	Spring washer
0419	53110403E	Hexagon nut
0420	54020601A	Flat washer P
0421	51570306B	P H tapt screw x 2
0422	51570306B	P H tapt screw x 4
0423	51570306B	P H tapt screw x 4
0424	51570306B	P H tapt screw x 4
0425	51570306B	P H tapt screw x 4
0426	51570306B	P H tapt screw x 4



REF. DESIG.	MARANTZ PART NO.	DESCRIPTION			REF. DESIG.	MARANTZ PART NO.	DESCRIPTION		
R157	RT1015314	Carbon, 15K $\Omega$ ,	$\pm 10\%$ ,	1/4W	C175	EA1060169	Elect.,	10 $\mu$ F,	16V
R158	RT1027214	Carbon, 2.7K $\Omega$ ,	$\pm 10\%$ ,	1/4W	C176-C177	DF1740301	Mylar,	0.04 $\mu$ F,	$\pm 20\%$
R159	RT1082314	Carbon, 82K $\Omega$ ,	$\pm 10\%$ ,	1/4W	C178	EA1060169	Elect.,	10 $\mu$ F,	16V
R160	RT1015214	Carbon, 1.5K $\Omega$ ,	$\pm 10\%$ ,	1/4W	C179	DF1740301	Mylar.,	0.04 $\mu$ F,	$\pm 20\%$
R162	RT1018314	Carbon, 18K $\Omega$ ,	$\pm 10\%$ ,	1/4W	C180	EA1060169	Elect.,	10 $\mu$ F,	16V
R163	RT1018414	Carbon, 180K $\Omega$ ,	$\pm 10\%$ ,	1/4W	C181	EA1060169	Elect.,	10 $\mu$ F,	16V
R164	RT1010214	Carbon, 1K $\Omega$ ,	$\pm 10\%$ ,	1/4W	C182	DD1620001	Ceramic,	20pF,	$\pm 10\%$
R165	RT1015214	Carbon, 1.5K $\Omega$ ,	$\pm 10\%$ ,	1/4W	C183	EA1060169	Elect.,	10 $\mu$ F,	16V
R166	RT1018314	Carbon, 18K $\Omega$ ,	$\pm 10\%$ ,	1/4W	C184	EA1070109	Elect.,	100 $\mu$ F,	10V
R167	RT1047314	Carbon, 47K $\Omega$ ,	$\pm 10\%$ ,	1/4W					
R168	RT1010214	Carbon, 1K $\Omega$ ,	$\pm 10\%$ ,	1/4W	L151	LA1001017	TRANSFORMERS		
R169	RT1022114	Carbon, 220 $\Omega$ ,	$\pm 10\%$ ,	1/4W	L152	LO1001042	RF Coil,	200 $\mu$ H	
R170	RT1015214	Carbon, 1.5K $\Omega$ ,	$\pm 10\%$ ,	1/4W	L153	LI1028002	OSC Coil,	120 $\mu$ H	
R171	RT1022214	Carbon, 2.2K $\Omega$ ,	$\pm 10\%$ ,	1/4W	L154	LI1001048	IFT		
R172	RT1047214	Carbon, 4.7K $\Omega$ ,	$\pm 10\%$ ,	1/4W	L153	LI1028003	IFT		
R173	RT1022414	Carbon, 220K $\Omega$ ,	$\pm 10\%$ ,	1/4W					
R174	RT1015214	Carbon, 1.5K $\Omega$ ,	$\pm 10\%$ ,	1/4W	J151-J162	YP1000094	MISCELLANEOUS		
R175	RT1056214	Carbon, 5.6K $\Omega$ ,	$\pm 10\%$ ,	1/4W			Plug		
R176	RT1010414	Carbon, 100K $\Omega$ ,	$\pm 10\%$ ,	1/4W					
R177	RT1010214	Carbon, 1K $\Omega$ ,	$\pm 10\%$ ,	1/4W			SEMICONDUCTORS		
R178	RT1010114	Carbon, 100 $\Omega$ ,	$\pm 10\%$ ,	1/4W	H151-H152	HT309411B	Transistor 2SC941 (O)		
R179	RT1022214	Carbon, 2.2K $\Omega$ ,	$\pm 10\%$ ,	1/4W	H153-H154	HT3037210	Transistor 2SC372		
R180	RT1010114	Carbon, 100 $\Omega$ ,	$\pm 10\%$ ,	1/4W	H155	HT306441C	Transistor 2SC644 (T)		
R181	RT1082114	Carbon, 820 $\Omega$ ,	$\pm 10\%$ ,	1/4W	H156-H160	HD1000105	Diode 1N60		
R182	RT1056214	Carbon, 56K $\Omega$ ,	$\pm 10\%$ ,	1/4W	P200	YD2819008	P. C. Board		
R183	RT1012314	Carbon, 12K $\Omega$ ,	$\pm 10\%$ ,	1/4W		(ZZ2819008)	P. C. Board Assembly		
R184	RT1082214	Carbon, 8.2K $\Omega$ ,	$\pm 10\%$ ,	1/4W					
R185	RT1010114	Carbon, 100 $\Omega$ ,	$\pm 10\%$ ,	1/4W			RESISTORS		
R186	RT1056214	Carbon, 5.6K $\Omega$ ,	$\pm 10\%$ ,	1/4W	R201	RT1015114	Carbon, 150 $\Omega$ ,	$\pm 10\%$ ,	1/4W
R187	RT1022214	Carbon, 2.2K $\Omega$ ,	$\pm 10\%$ ,	1/4W	R202	RT1015214	Carbon, 1.5K $\Omega$ ,	$\pm 10\%$ ,	1/4W
R188	RT1010114	Carbon, 100 $\Omega$ ,	$\pm 10\%$ ,	1/4W	R203	RT1033214	Carbon, 3.3K $\Omega$ ,	$\pm 10\%$ ,	1/4W
C151	DF1740301	CAPACITORS			R204-R205	RT1010214	Carbon, 1K $\Omega$ ,	$\pm 10\%$ ,	1/4W
C152	DF1710301	Mylar, 0.04 $\mu$ F,	$\pm 20\%$		R206	RT1082114	Carbon, 820 $\Omega$ ,	$\pm 10\%$ ,	1/4W
C153	DF1740301	Mylar, 0.01 $\mu$ F,	$\pm 20\%$		R207	RT1015114	Carbon, 150 $\Omega$ ,	$\pm 10\%$ ,	1/4W
C154	DD1105001	Ceramic, 5pF,	$\pm 0.5\text{pF}$ ,		R208	RT1051214	Carbon, 1.5K $\Omega$ ,	$\pm 10\%$ ,	1/4W
C155	DF1740301	Mylar, 0.04 $\mu$ F,	$\pm 20\%$		R209	RT1033214	Carbon, 3.3K $\Omega$ ,	$\pm 10\%$ ,	1/4W
C156	DF1747201	Mylar, 0.0047 $\mu$ F,	$\pm 20\%$		R210-R211	RT1010214	Carbon, 1K $\Omega$ ,	$\pm 10\%$ ,	1/4W
C157	DF1722301	Mylar, 0.022 $\mu$ F,	$\pm 20\%$		R212	RT1010414	Carbon, 100K $\Omega$ ,	$\pm 10\%$ ,	1/4W
C158	DF6545101	Mylar, 450pF,	$\pm 5\%$		R213-R214	RT1015114	Carbon, 150 $\Omega$ ,	$\pm 10\%$ ,	1/4W
C160	DF1740301	Mylar, 0.04 $\mu$ F,	$\pm 20\%$		R215	RT1082114	Carbon, 820 $\Omega$ ,	$\pm 10\%$ ,	1/4W
C161-C162	EA1060169	Elect.,	10 $\mu$ F,	16V	R216	RT1015114	Carbon, 150 $\Omega$ ,	$\pm 10\%$ ,	1/4W
C163	DF1740301	Mylar, 0.04 $\mu$ F,	$\pm 20\%$		R217	RT1015214	Carbon, 1.5K $\Omega$ ,	$\pm 10\%$ ,	1/4W
C164-C166	EA1060169	Elect.,	10 $\mu$ F,	16V	R218	RT1033214	Carbon, 3.3K $\Omega$ ,	$\pm 10\%$ ,	1/4W
C167	DK1710201	Ceramic, 0.001 $\mu$ F,	$\pm 20\%$		R219-R220	RT1010214	Carbon, 1K $\Omega$ ,	$\pm 10\%$ ,	1/4W
C168	DF1747201	Mylar, 0.0047 $\mu$ F,	$\pm 20\%$		R221	RT1010414	Carbon, 100K $\Omega$ ,	$\pm 10\%$ ,	1/4W
C169	DF1722201	Mylar, 0.0022 $\mu$ F,	$\pm 20\%$		R222	RT1015114	Carbon, 150 $\Omega$ ,	$\pm 10\%$ ,	1/4W
C170	DF1668301	Mylar, 0.068 $\mu$ F,	$\pm 10\%$		R223	RT1022114	Carbon, 220 $\Omega$ ,	$\pm 10\%$ ,	1/4W
C171	EA1060169	Elect.,	10 $\mu$ F,	16V	R224	RT1082114	Carbon, 820 $\Omega$ ,	$\pm 10\%$ ,	1/4W
C172	DF1740301	Mylar, 0.04 $\mu$ F,	$\pm 20\%$		R225	RT1015114	Carbon, 150 $\Omega$ ,	$\pm 10\%$ ,	1/4W
C173	EA1060169	Elect.,	10 $\mu$ F,	16V	R226	RT1082214	Carbon, 8.2K $\Omega$ ,	$\pm 10\%$ ,	1/4W
C174	DF1740301	Mylar, 0.04 $\mu$ F,	$\pm 20\%$		R227	RT1015314	Carbon, 15K $\Omega$ ,	$\pm 10\%$ ,	1/4W
					R228-R229	RT1010214	Carbon, 1K $\Omega$ ,	$\pm 10\%$ ,	1/4W
					R230	RT1027114	Carbon, 270 $\Omega$ ,	$\pm 10\%$ ,	1/4W

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION	REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
R231	RT1010414	Carbon, 100K $\Omega$ , $\pm 10\%$ , 1/4W	R301	RT1010214	RESISTORS
R232	RT1082214	Carbon, 8.2K $\Omega$ , $\pm 10\%$ , 1/4W	R302-R303	RN1047414	Carbon, 470K $\Omega$ , $\pm 10\%$ , 1/4W
R233	RT1015314	Carbon, 15K $\Omega$ , $\pm 10\%$ , 1/4W	R304	RT1015214	Carbon, 1.5K $\Omega$ , $\pm 10\%$ , 1/4W
R234	RT1015114	Carbon, 150 $\Omega$ , $\pm 10\%$ , 1/4W	R305	RT1027314	Carbon, 2.7K $\Omega$ , $\pm 10\%$ , 1/4W
R236	RT1010214	Carbon, 1K $\Omega$ , $\pm 10\%$ , 1/4W	R306	RT1012314	Carbon, 12K $\Omega$ , $\pm 10\%$ , 1/4W
R237	RT1015114	Carbon, 150 $\Omega$ , $\pm 10\%$ , 1/4W	R307	RT1012214	Carbon, 1.2K $\Omega$ , $\pm 10\%$ , 1/4W
R238	RT1010414	Carbon, 100K $\Omega$ , $\pm 10\%$ , 1/4W	R308	RT1015214	Carbon, 1.5K $\Omega$ , $\pm 10\%$ , 1/4W
R239	RT1015114	Carbon, 150 $\Omega$ , $\pm 10\%$ , 1/4W	R309	RT1022214	Carbon, 2.2K $\Omega$ , $\pm 10\%$ , 1/4W
R240	RT1047114	Carbon, 470 $\Omega$ , $\pm 10\%$ , 1/4W	R310	RT1027314	Carbon, 27K $\Omega$ , $\pm 10\%$ , 1/4W
R241	RT1010114	Carbon, 100 $\Omega$ , $\pm 10\%$ , 1/4W	R311	RT1039114	Carbon, 390 $\Omega$ , $\pm 10\%$ , 1/4W
R242	RT1047214	Carbon, 4.7K $\Omega$ , $\pm 10\%$ , 1/4W	R312	RT1012214	Carbon, 1.2K $\Omega$ , $\pm 10\%$ , 1/4W
R243	RT1012314	Carbon, 12K $\Omega$ , $\pm 10\%$ , 1/4W	R313-R316	RT0510214	Carbon, 1K $\Omega$ , $\pm 5\%$ , 1/4W
R244	RT1010214	Carbon, 1K $\Omega$ , $\pm 10\%$ , 1/4W	R317	RT1010314	Carbon, 10K $\Omega$ , $\pm 10\%$ , 1/4W
R245	RT1022214	Carbon, 2.2K $\Omega$ , $\pm 10\%$ , 1/4W	R318	RT1015314	Carbon, 15K $\Omega$ , $\pm 10\%$ , 1/4W
R246	RT1033314	Carbon, 33K $\Omega$ , $\pm 10\%$ , 1/4W	R319	RT1015114	Carbon, 150K $\Omega$ , $\pm 10\%$ , 1/4W
R247	RT1056314	Carbon, 56K $\Omega$ , $\pm 10\%$ , 1/4W	R320	RT1010414	Carbon, 100K $\Omega$ , $\pm 10\%$ , 1/4W
R248	RT1012314	Carbon, 12K $\Omega$ , $\pm 10\%$ , 1/4W	R321	RT1022114	Carbon, 220 $\Omega$ , $\pm 10\%$ , 1/4W
R249-R252	RT1010114	Carbon, 100 $\Omega$ , $\pm 10\%$ , 1/4W	R322-R323	RT1022414	Carbon, 220K $\Omega$ , $\pm 10\%$ , 1/4W
R254	RT1010314	Carbon, 10K $\Omega$ , $\pm 10\%$ , 1/4W	R324	RT1033014	Carbon, 33 $\Omega$ , $\pm 10\%$ , 1/4W
R255	RT1018314	Carbon, 18K $\Omega$ , $\pm 10\%$ , 1/4W	R325	RT1012414	Carbon, 120K $\Omega$ , $\pm 10\%$ , 1/4W
R256	RT1022314	Carbon, 22K $\Omega$ , $\pm 10\%$ , 1/4W	R326	RT1015314	Carbon, 15K $\Omega$ , $\pm 10\%$ , 1/4W
R257	RT1027314	Carbon, 27K $\Omega$ , $\pm 10\%$ , 1/4W	R327	RT1056214	Carbon, 5.6K $\Omega$ , $\pm 10\%$ , 1/4W
R258	RT1022314	Carbon, 22K $\Omega$ , $\pm 10\%$ , 1/4W	R328	RT1033314	Carbon, 33K $\Omega$ , $\pm 10\%$ , 1/4W
R259	RT1012314	Carbon, 12K $\Omega$ , $\pm 10\%$ , 1/4W	R329	RT1022414	Carbon, 220K $\Omega$ , $\pm 10\%$ , 1/4W
C201-C207	DK1710301	CAPACITORS	R330	RT1068314	Carbon, 68K $\Omega$ , $\pm 10\%$ , 1/4W
C208	DK1710201	Ceramic, 0.01 $\mu$ F, $\pm 20\%$	R331	RT1056314	Carbon, 56K $\Omega$ , $\pm 10\%$ , 1/4W
C209-C212	DK1710301	Ceramic, 0.001 $\mu$ F, $\pm 20\%$	R332	RT0518414	Carbon, 180K $\Omega$ , $\pm 5\%$ , 1/4W
C213	DK1810402	Ceramic, 0.01 $\mu$ F, $\pm 20\%$	R333	RT1010414	Carbon, 100K $\Omega$ , $\pm 10\%$ , 1/4W
C214-C217	DK1810402	Ceramic, 0.1 $\mu$ F, $\pm 80\%$ , $-20\%$	R334	RT1012414	Carbon, 120K $\Omega$ , $\pm 10\%$ , 1/4W
C218	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$	R335-R336	RT0515314	Carbon, 15K $\Omega$ , $\pm 5\%$ , 1/4W
C219-C225	DK1810402	Ceramic, 0.1 $\mu$ F, $\pm 80\%$ , $-20\%$	R337-R338	RT0510414	Carbon, 100K $\Omega$ , $\pm 5\%$ , 1/4W
C226	DD1540001	Ceramic, 0.04 $\mu$ F, $\pm 20\%$	R339-R340	RN0582414	Carbon, 820K $\Omega$ , $\pm 5\%$ , 1/4W
C227	DD1620101	Ceramic, 40pF, $\pm 5\%$	R341-R342	RT0512214	Carbon, 3.3K $\Omega$ , $\pm 5\%$ , 1/4W
C228	DD1620101	Ceramic, 200pF, $\pm 10\%$	R343-R344	RN0522314	Carbon, 22K $\Omega$ , $\pm 5\%$ , 1/4W
C229	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$	R345-R346	RT0568214	Carbon, 6.8K $\Omega$ , $\pm 5\%$ , 1/4W
C230	DD1620101	Ceramic, 200pF, $\pm 10\%$	R347-R348	RT0510214	Carbon, 1K $\Omega$ , $\pm 5\%$ , 1/4W
C231	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$	R349-R350	RT0512214	Carbon, 1.2K $\Omega$ , $\pm 5\%$ , 1/4W
C232	DD1620101	Ceramic, 40pF, $\pm 5\%$	R351-R352	RT0536214	Carbon, 3.6K $\Omega$ , $\pm 5\%$ , 1/4W
C233	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$	R353	RT1082314	Carbon, 82K $\Omega$ , $\pm 10\%$ , 1/4W
C234	DD1620101	Ceramic, 200pF, $\pm 10\%$	R354	RT1022214	Carbon, 2.2K $\Omega$ , $\pm 10\%$ , 1/4W
C235	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$	R355	RT1056314	Carbon, 56K $\Omega$ , $\pm 10\%$ , 1/4W
C236	DD1620101	Ceramic, 200pF, $\pm 10\%$	R356	RT1010414	Carbon, 100K $\Omega$ , $\pm 10\%$ , 1/4W
C237	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$	R357-R358	RN1047414	Carbon, 470K $\Omega$ , $\pm 10\%$ , 1/4W
C238	DD1620101	Ceramic, 200pF, $\pm 10\%$	R359-R360	RN1022414	Carbon, 220K $\Omega$ , $\pm 10\%$ , 1/4W
C239	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$	R361-R362	RT1047214	Carbon, 4.7K $\Omega$ , $\pm 10\%$ , 1/4W
C240	DD1620101	Ceramic, 200pF, $\pm 10\%$	R363	RT1018214	Carbon, 1.8K $\Omega$ , $\pm 10\%$ , 1/4W
C241	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$	R364	RT1056114	Carbon, 560K $\Omega$ , $\pm 10\%$ , 1/4W
C242	DD1620101	Ceramic, 200pF, $\pm 10\%$	R365	RA0502013	Trimmer, 5K $\Omega$ , B
C243	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$	R366-R367	RT1022414	Carbon, 220K $\Omega$ , $\pm 10\%$ , 1/4W
C244	DD1620101	Ceramic, 200pF, $\pm 10\%$	R368-R369	RT1047114	Carbon, 470 $\Omega$ , $\pm 10\%$ , 1/4W
C245	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$	R374	RT1068214	Carbon, 6.8K $\Omega$ , $\pm 10\%$ , 1/4W
C246	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C247	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C248	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C249	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C250	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C251	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C252	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C253	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C254	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C255	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C256	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C257	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C258	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C259	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C260	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C261	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C262	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C263	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C264	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C265	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C266	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C267	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C268	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C269	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C270	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C271	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C272	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C273	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C274	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C275	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C276	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C277	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C278	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C279	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C280	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C281	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C282	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C283	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C284	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C285	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C286	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C287	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C288	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C289	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C290	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C291	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C292	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C293	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C294	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C295	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C296	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C297	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C298	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C299	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C300	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C301	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C302	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C303	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C304	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C305	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C306	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C307	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C308	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C309	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C310	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C311	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C312	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C313	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C314	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C315	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C316	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C317	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C318	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C319	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C320	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C321	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C322	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C323	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C324	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C325	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C326	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C327	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C328	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C329	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C330	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C331	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C332	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C333	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C334	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C335	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C336	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C337	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C338	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C339	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			
C340	DD1620101	Ceramic, 200pF, $\pm 10\%$			
C341	DK1710301	Ceramic, 0.01 $\mu$ F, $\pm 20\%$			



REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
C406-C407	EA4760509	Elect., 47 $\mu$ F, 50V
C408	EA1070259	Elect., 100 $\mu$ F, 25V
C409	EA1070359	Elect., 100 $\mu$ F, 35V
C410-C413	EV1050251	Elect., 1 $\mu$ F, 25V
J401-J416	YP1000099	MISCELLANEOUS
H401	HT312132A	SEMICONDUCTORS
H402-H403	HT304582A	Transistor, 2SC1213A B or C
H404-H405	HT104942A	Transistor, 2SC458 LG (D) or (C)
H406-H407	HD2000413	Transistor, 2SA494 (Y) or (GR)
H408	HD3002109	Diode, SIB'01-02 (200PIV, 1A)
P600	YD2827002 (ZZ2826002)	Diode, BZ140  P. C. Board P. C. Board Assembly
M601-M604	IN1006301	MISCELLANEOUS
J601-J605	YP1000094	Lamp 6,3V, 0.04A Plug
P700	YD2827003 (ZZ2827003)	P. C. Board P. C. Board Assembly
S701	SP0605002	MISCELLANEOUS Push Switch
R701	RT1082214	RESISTOR Carbon, 8.2K $\Omega$ , $\pm$ 10%, 1/4W
C701	DF1622301	CAPACITOR Mylar, 0.022 $\mu$ F, $\pm$ 10%
L001	LF1120023	TRANSFORMERS
L002	LB3007526	AM Ant. Coil
L003	LC1302001	Balun Coil
L004	TS1660803	Choke Coil
L005	LC1302001	Power Transf. Choke Coil, 3 $\mu$ H
H001	HT403154A	MISCELLANEOUS
M001	IM1104204	Transistor, 2SD315 (C, D, E, F)
M003-M007	IN1008007	Signal DC Mete
S001	SS0202017	Lamp 8V 0.06A
S003	SP0201010	Slide Switch
J001	YT0104011	Power Switch
J004	YL0106004	Terminal for Ant.
J005	YJ0800012	Terminal
J007	YL0105001	Fuse Holder
J009	YL0104001	5P Terminal
J010	YJ0800013	4P Terminal
J011-J014	YJ0800013	Meter Socket
J015	YL0301021	Dial Illumination Socket Ground Terminal

REF. DESIG.	MARANTZ PART NO.	DESCRIPTION
J016	YJ0500017	Transistor Socket
J017	YL0103001	Terminal
J018	YL0103001	Terminal
F001	FS1005007	Fuse
W001	YC0240010	AC Cord
W002-W003	YB0007001	Connective Cord
W004	YB0027001	Connective Cord
W005	YW2827001	Wire Material
W006	YX2827001	Wire Material
R001	RC1008212	RESISTORS
R002-R003	RC1068012	Solid, 8.2 $\Omega$ , $\pm$ 10%, 1/2W
R004	RK0254002	Solid, 68 $\Omega$ , $\pm$ 10%, 1/2W
R005-R006	RK0104003	Variable, 250K $\Omega$ , (B)
R007	GS1010105	Variable, 100K $\Omega$ , (B)
R008	RC1039012	Carbon, 100 $\Omega$ , $\pm$ 10%, 5W
R009	GT0522501	Solid, 39 $\Omega$ , $\pm$ 10%, 1/2W
R011	RT1056114	Carbon, 2.2M $\Omega$ , $\pm$ 5%, 1W
R012	RC1018012	Carbon, 560 $\Omega$ , $\pm$ 10%, 1K
R013	RT1056114	Solid, 18 $\Omega$ , $\pm$ 10%, 1/4W
R014	RT1082414	Carbon, 560 $\Omega$ , $\pm$ 10%, 1/4W
C001	EA3360109	Carbon, 820K $\Omega$ , $\pm$ 10%, 1/4W
C003	DK1710301	CAPACITORS
C004	DO0733380	Elect., 33 $\mu$ F, 10V Ceramic, 0.01 $\mu$ F, 50V, YY Oil Paper, 0.033 $\mu$ F, 80VAC $\pm$ 20%

## SPECIFICATIONS

### FM Sections:

Tuning Frequency Range	88-108 MHz
IHFM Usable Sensitivity	2.3 $\mu$ V
IHFM Selectivity	60dB
Capture Ratio	1.6dB
Image Rejection Ratio at 106MHz	70dB
Signal to Noise Ratio (Mono)	70dB
Signal to Noise Ratio (Stereo)	60dB
Total Harmonic Distortion (Mono)	0.15%
Total Harmonic Distortion (Stereo)	0.3%
Frequency Response (ref. 75 $\mu$ sec. de-emphasis)	$\pm$ 1dB, 50 Hz-15KHz
Stereo Separation at 1KHz	42dB

### AM Sections:

Tuning Frequency Range	540-1600KHz
Usable Sensitivity	20 $\mu$ V
Selectivity	26dB
Image Rejection Ratio	70dB
Signal to Noise Ratio	46dB
Frequency Response, -3dB down	50Hz-4KHz
Total Harmonic Distortion	1%

### General:

Power Requirements	100/120/200/220/240 V AC
	50 to 60 Hz
Power Consumption	25 Watts
Dimensions	
Panel Width	14-11/64
Panel Height	4-23/32
Depth	11-1/32
Weight	
Unit alone	15,4 lbs
Packed for Shipment	22,4 lbs

\*These specifications and exterior designs may be changed for improvement without advance notice.